

Cel-002  
SEQUENCE LISTING

&lt;110&gt; GARDNER, Timothy

&lt;120&gt; Bistable Genetic Toggle Switch

&lt;130&gt; CEL-002

&lt;150&gt; PCT/US99/28592

&lt;151&gt; 1999-12-01

&lt;150&gt; US 60/110,616

&lt;151&gt; 1998-12-02

&lt;160&gt; 17

&lt;170&gt; PatentIn version 3.0

&lt;210&gt; 1

&lt;211&gt; 90

&lt;212&gt; DNA

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; Promoter Ptrc-2

&lt;400&gt; 1

ccatcgaatg gctgaaatga gctgttgaca attaatcatc cggctcgtat aatgtgtgga  
60attgtgagcg gataacaatt tcacacagga  
90

&lt;210&gt; 2

&lt;211&gt; 102

&lt;212&gt; DNA

&lt;213&gt; Artificial

&lt;220&gt;

&lt;223&gt; Promoter PL-s1con

&lt;400&gt; 2

gcatgcacag ataaccatct gcggtgataa attatctctg gcggtgttga cataaatacc  
60actggcggtt ataatgagca catcagcagg gtatgcaaag ga  
02

1

&lt;210&gt; 3

&lt;211&gt; 84

Cel-002

<212> DNA

<213> Artificial

<220>

<223> Promoter Pltet0-1

<400> 3

gcatgctccc tatcagtgat agagattgac atccctatca gtgatagaga tactgagcac  
60

atcagcagga cgcactgacc agga  
84

<210> 4

<211> 15

<212> DNA

<213> Artificial

<220>

<223> Ribosome Binding Site A

<400> 4

aggaggaaaa aaatg  
15

<210> 5

<211> 13

<212> DNA

<213> Artificial

<220>

<223> Ribosome Binding Site B

<400> 5

aggaatttaa atg  
13

<210> 6

<211> 15

<212> DNA

<213> Artificial

<220>

<223> Ribosome Binding Site C

<400> 6

aggaaacaga ccatg  
15

<210> 7  
 <211> 17  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Ribosome Binding Site D

<400> 7  
 aggaaaccgg ttcgatg  
 17

<210> 8  
 <211> 15  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Ribosome Binding Site E

<400> 8  
 aggaaaccgg ttatg  
 15

<210> 9  
 <211> 14  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Ribosome Binding Site F

<400> 9  
 aggacggttc gatg  
 14

<210> 10  
 <211> 16  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Ribosome Binding Site G

<400> 10  
 aggaaaggcc tcgatg  
 16

Cel-002

<210> 11  
 <211> 14  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Ribosome Binding Site H

<400> 11  
 aggacggccg gatg  
 14

<210> 12  
 <211> 6086  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Plasmid pTAK117

<400> 12  
 ccacgaatg gctgaaatga gctgttgaca attaatacatc cggctcgtat aatgtgtgga  
 60

attgtgagcg gataacaatt tcacacagga aaccggttat gagcacaaaa aagaaaccat 1  
 20

taacacaaga gcagcttgag gacgcacgtc gccttaaagc aatttatgaa aaaaagaaaa 1  
 80

atgaacttgg cttatcccag gaatctgtcg cagacaagat ggggatgggg cagtcaggcg 2  
 40

ttggtgcttt atttaatggc atcaatgcat taaatgctta taacgccgca ttgcttgcaa 3  
 00

aaattctcaa agttagcggt gaagaattta gcccttcaat cgccagagaa atctacgaga 3  
 60

tgtatgaagc ggtagtatg cagccgtcac ttagaagtga gtatgagtac cctgtttttt 4  
 20

ctcatgttca ggcagggatg ttctcacctg agcttagaac ctttaccaa agtgatgcgg 4  
 80

agagatgggt aagcacaacc aaaaaagcca gtgattctgc attctggctt gaggttgaag 5  
 40

gtaattccat gaccgcacca acaggctcca agccaagctt tcctgacgga atgttaattc 6  
 00



Cel-002

atacaaataa aagctagctt ggctgttttg gcggatgaga gaagattttc agcctgatac 16  
80

agattaaatc agaacgcaga agcggctctga taaaacagaa tttgcctggc ggcagtagcg 17  
40

cggtggtccc acctgacccc atgccgaact cagaagtga aacgccgtagc gccgatggta 18  
00

gtgtgggggtc tccccatgcg agagtaggga actgccaggc atcaaataaa acgaaaggct 18  
60

cagtcgaaag actgggcctt tcgtttttatc tgttggttgt cggtgaacgc tctcctgagt 19  
20

aggacaaatc cgccgggagc ggatttgaac gttgcgaagc aacggcccgg aggggtggcgg 19  
80

gcaggacgcc cgccataaac tgccaggcat caaattaagc agaaggccat cctgacggat 20  
40

ggcctttttg cgtttctaca aactcttttt gtttattttt ctaaatacat tcaaatatgt 21  
00

atccgctcat gagacaataa ccctgataaa tgcttcaata atattgaaaa aggaagagta 21  
60

tgagtattca acatttccgt gtcgccctta ttcccttttt tgcggcattt tgccttcctg 22  
20

tttttgctca cccagaaacg ctggtgaaag taaaagatgc tgaagatcag ttgggtgcac 22  
80

gagtgggtta catcgaactg gatctcaaca gcggtaagat ccttgagagt ttctgccccg 23  
40

aagaacgttt tccaatgatg agcactttta aagttctgct atgtggcgcg gtattatccc 24  
00

gtgttgacgc cgggcaagag caactcggtc gccgcataca ctattctcag aatgacttgg 24  
60

ttgagtactc accagtcaca gaaaagcatc ttacggatgg catgacagta agagaattat 25  
20

gcagtgctgc cataaccatg agtgataaca ctgcggccaa cttacttctg acaacgatcg 25  
80

gaggaccgaa ggagctaacc gcttttttgc acaacatggg ggatcatgta actcgccttg 26  
40

atcgttggga accggagctg aatgaagcca taccaaacga cgagcgtgac accacgatgc 27

00

ctacagcaat ggcaacaacg ttgcgcaaac tattaactgg cgaactactt actctagctt 27  
60

cccggcaaca attaatagac tggatggagg cggataaagt tgcaggacca cttctgcgct 28  
20

cggcccttcc ggctggctgg tttattgctg ataaatctgg agccggtgag cgtgggtctc 28  
80

gcggtatcat tgcagcactg gggccagatg gtaagccctc ccgtatcgta gttatctaca 29  
40

cgacgggggag tcaggcaact atggatgaac gaaatagaca gatcgctgag ataggtgcct 30  
00

cactgattaa gcattggtaa ctgtcagacc aagtttactc atatatactt tagattgatt 30  
60

taaaacttca tttttaattt aaaaggatct aggtgaagat cttttttgat aatctcatga 31  
20

ccaaaatccc ttaacgtgag ttttcgttcc actgagcgtc agaccccgta gaaaagatca 31  
80

aaggatcttc ttgagatcct ttttttctgc gcgtaatctg ctgcttgcaa acaaaaaaac 32  
40

caccgctacc agcgggtggtt tgtttgccgg atcaagagct accaactctt tttccgaagg 33  
00

taactggctt cagcagagcg cagataccaa atactgtcct tctagtgtag ccgtagttag 33  
60

gccaccactt caagaactct gtagcaccgc ctacatacct cgctctgcta atcctgttac 34  
20

cagtggctgc tgccagtggc gataagtcgt gtcttaccgg gttggactca agacgatagt 34  
80

taccggataa ggcgcagcgg tcgggctgaa cgggggggttc gtgcacacag cccagcttgg 35  
40

agcgaacgac ctacaccgaa ctgagatacc tacagcgtga gctatgagaa agcgccacgc 36  
00

ttcccgaagg gagaaaggcg gacaggtatc cggtaagcgg cagggtcgga acaggagagc 36  
60

gcacgagggga gcttccaggg ggaaacgcct ggtatcttta tagtcctgtc gggtttccgc 37  
20

Cel-002

acctctgact tgagcgtcga tttttgtgat gctcgtcagg ggggcggagc ctatggaaaa 37  
80

acgccagcaa cgcggccttt ttacggttcc tggccttttg ctggcctttt gctcacatgt 38  
40

tctttcctgc gttatcccct gattctgtgg ataaccgtat taccgccttt gagtgagctg 39  
00

ataccgctcg ccgcagccga acgaccgagc gcagcgagtc agtgagcgag gaagcggaag 39  
60

agcgagtttg tagaaacgca aaaaggccat ccgtcaggat ggccttctgc ttaatttgat 40  
20

gcctggcagt ttatggcggg cgtcctgccc gccaccctcc gggccgttgc ttcgcaacgt 40  
80

tcaaatccgc tcccggcgga tttgtcctac tcaggagagc gttcaccgac aaacaacaga 41  
40

taaaacgaaa ggcccagtct ttcgactgag cctttcgttt tatttgatgc ctggcagttc 42  
00

cctactctcg catggggaga cccacacta ccatcggcgc tacggcgttt cacttctgag 42  
60

ttcggcatgg ggtcaggtgg gaccaccgcg ctactgccgc caggcaaatt ctgttttatc 43  
20

agaccgcttc tgcgttctga tttaatctgt atcaggctga aaatcttctc tcatccgcca 43  
80

aaacagccaa gcttacttaa ctgcagtcac tgcccgtttt ccagtcggga aacctgtcgt 44  
40

gccagctgca ttaatgaatc ggccaacgcg cggggagagg cggtttgcgt attgggcgcc 45  
00

agggtgggtt ttctttttcac cagtgagacg ggcaacagct gattgccctt caccgcctgg 45  
60

ccctgagaga gttgcagcaa gcggtccacg ctggtttgcc ccagcaggcg aaaatcctgt 46  
20

ttgatgggtg ttaacggcgg gatataacat gagctgtctt cggtatcgtc gtatcccact 46  
80

accgagatat ccgcaccaac gcgcagcccg gactcggtaa tggcgcgcat tgcgcccagc 47  
40



Cel-002

gccatctgat cgttggcaac cagcatcgca gtgggaacga tgccctcatt cagcatttgc 48  
00

atggtttgtt gaaaaccgga catggcactc cagtcgcctt cccgttccgc tatcggctga 48  
60

atttgattgc gagtgaata tttatgccag ccagccagac gcagacgcgc cgagacagaa 49  
20

cttaatgggc ccgctaacag cgcgatttgc tggtagacca atgcgaccag atgctccacg 49  
80

cccagtcgcg taccgtcttc atgggagaaa ataatactgt tgatgggtgt ctggtcagag 50  
40

acatcaagaa ataacgccgg aacattagtg caggcagctt ccacagcaat ggcacacctg 51  
00

tcacccagcg gatagttaat gatcagccca ctgacgcgtt gcgcgagaag attgtgcacc 51  
60

gccgctttac aggccttcgac gccgcttcgt tctaccatcg acaccaccac gctggcacc 52  
20

agttgatcgg cgcgagattt aatcgccgcg acaatttgcg acggcgcggtg cagggccaga 52  
80

ctggaggtgg caacgccaat cagcaacgac tgtttgcccg ccagttgttg tgccacgcgg 53  
40

ttgggaatgt aattcagctc cgccatcgcc gcttccactt tttcccgct tttcgcagaa 54  
00

acgtggctgg cctgggtcac cagcggggaa acggtctgat aagagacacc ggcatactct 54  
60

gcgacatcgt ataacgttac tggtttcata tgcacgaac cggtttcctt tgcatacacc 55  
20

ataggtgtgg tttaatttga tgcccttttt cagggtctga atgtgtaaga gcgggggttat 55  
80

ttatgctgtt gtttttttgt tactcgggaa gggctttacc tcttccgcat aaacgcttcc 56  
40

atcagcgttt atagttaaaa aaatctttcg gaactgggtt tgcgcttacc ccaaccaaca 57  
00

ggggatttgc tgctttccat tgagcctgtt tctctgcgcg acgttcgcgg cggcgtgttt 57  
60

gtgcatccat ctggattctc ctgtcagtta gctttgggtg tgtgtggcag ttgtagtcct 58

20

gaacgaaaac cccccgcatg tggcacattg gcagctaatac cggaatcgca cttacggcca 58  
80

atgcttcggt tcgtatcaca caccctaaag ccttctgctt tgaatgctgc ccttcttcag 59  
40

ggcttaattt ttaagagcgt caccttcatg gtgggtcagtg cgtcctgctg atgtgctcat 60  
00

tataaccgcc agtggtattt atgtcaacac cgccagagat aatttatcac cgcagatggg 60  
60

tatctgtgca tgcatttacg ttgaca 60  
86

<210> 13

<211> 6086

<212> DNA

<213> Artificial

<220>

<223> Plasmid pTAK131

<400> 13

ccatcgaatg gctgaaatga gctgttgaca attaatacatc cggctcgtat aatgtgtgga 60  
60

attgtgagcg gataacaatt tcacacagga aaccgggttat gagcacaaaa aagaaccat 1  
20

taacacaaga gcagcttgag gacgcacgtc gccttaaagc aatttatgaa aaaaagaaaa 1  
80

atgaacttgg cttatcccag gaatctgtcg cagacaagat ggggatgggg cagtcaggcg 2  
40

ttggtgcttt atttaatggc atcaatgcat taaatgctta taacgccgca ttgcttgcaa 3  
00

aaattctcaa agttagcgtt gaagaattta gcccttcaat cgccagagaa atctacgaga 3  
60

tgtatgaagc ggtagtatg cagccgtcac ttagaagtga gtatgagtac cctgtttttt 4  
20

ctcatgttca ggcagggatg ttctcacctg agcttagaac ctttaccaa agtgatgcgg 4  
80

agagatgggt aagcacaacc aaaaaagcca gtgattctgc attctggctt gaggttgaag 5

gtaattccat 00	gaccgcacca	acaggctcca	agccaagctt	tcctgacgga	atgttaattc	6
tcgttgaccc 60	tgaacaggct	gttgagccag	gtgatttctg	catagccaga	cttgggggtg	6
atgagtttac 20	cttcaagaaa	ctgatcaggg	atagcggcca	ggtgttttta	caaccactaa	7
acccacagta 80	cccaatgatc	ccatgcaatg	agagttgttc	cgttggtggg	aaagttatcg	7
ctagtcagtg 40	gcctgaagag	acgtttggct	gactgcagca	taaataaccc	cgctcttaca	8
cattccagcc 00	ctgaaaaagg	gcatcaaatt	aaaccacacc	tatggtgtat	gcaaaggaat	9
ttaaattgggt 60	accatgagta	aaggagaaga	acttttcact	ggagttgtcc	caattcttgt	9
tgaattagat 20	ggcgatgtta	atgggcaaaa	attctctgtc	agtggagagg	gtgaagggtga	10
tgcaacatac 80	ggaaaactta	cccttaaatt	tatttgcact	actgggaagc	tacctgttcc	10
atggccaaca 40	cttgtcacta	ctttcgggta	tggtgttcaa	tgctttgcga	gatacccaga	11
tcatatgaaa 00	cagcatgact	ttttcaagag	tgccatgccc	gaaggttatg	tacaggaaag	12
aactatatatt 60	tacaaagatg	acgggaacta	caagacacgt	gctgaagtca	agtttgaagg	12
tgataccctt 20	gttaatagaa	tcgagttaaa	aggtattgat	tttaaagaag	atggaaacat	13
tcttggacac 80	aaaatggaat	acaactataa	ctcacataat	gtatacatca	tggcagacaa	13
accaaagaat 40	ggaatcaaag	ttaacttcaa	aattagacac	aacattaaag	atggaagcgt	14
tcaattagca 00	gaccattatc	aacaaaatac	tccaattggc	gatggccctg	tccttttacc	15
agacaaccat 60	tacctgtcca	cacaatctgc	cctttccaaa	gatcccaacg	aaaagagaga	15

# SECRET

20

80

40

00

60

20

80

40

00

60

20

80

40

00

60

20

80

Cel-002

gaggaccgaa ggagctaacc gcttttttgc acaacatggg ggatcatgta actcgccttg 26  
40

atcgttggga accggagctg aatgaagcca taccaaacga cgagcgtgac accacgatgc 27  
00

ctacagcaat ggcaacaacg ttgcgcaaac tattaactgg cgaactactt actctagctt 27  
60

cccggcaaca attaatagac tggatggagg cggataaagt tgcaggacca cttctgcgct 28  
20

cggcccttcc ggctggctgg tttattgctg ataaatctgg agccggtgag cgtgggtctc 28  
80

gcggtatcat tgcagcactg gggccagatg gtaagccctc ccgtatcgta gttatctaca 29  
40

cgacgggggag tcaggcaact atggatgaac gaaatagaca gatcgcctgag ataggtgcct 30  
00

cactgattaa gcattggtaa ctgtcagacc aagtttactc atatatactt tagattgatt 30  
60

taaaacttca tttttaattt aaaaggatct aggtgaagat cttttttgat aatctcatga 31  
20

ccaaaatccc ttaacgtgag ttttcgttcc actgagcgtc agaccccgta gaaaagatca 31  
80

aaggatcttc ttgagatcct ttttttctgc gcgtaatctg ctgcttgcaa acaaaaaaac 32  
40

caccgctacc agcgggtggtt tgtttgccgg atcaagagct accaactctt tttccgaagg 33  
00

taactggctt cagcagagcg cagataccaa atactgtcct tctagtgtag ccgtagttag 33  
60

gccaccactt caagaactct gtagcaccgc ctacatacct cgctctgcta atcctgttac 34  
20

cagtggctgc tgccagtggc gataagtcgt gtcttaccgg gttggactca agacgatagt 34  
80

taccggataa ggcgacgcgg tcgggctgaa cgggggggttc gtgcacacag cccagcttgg 35  
40

agcgaacgac ctacaccgaa ctgagatacc tacagcgtga gctatgagaa agcgccacgc 36  
00

ttcccgaagg gagaaaggcg gacaggtatc cggttaagcgg cagggtcgga acaggagagc 36

60

gcacgagggg gcttccaggg ggaaacgcct ggtatcttta tagtcctgtc gggtttcgcc 37  
20

acctctgact tgagcgtcga tttttgtgat gctcgtcagg ggggcggagc ctatggaaaa 37  
80

acgccagcaa cgcggccttt ttacggttcc tggccttttg ctggcctttt gctcacatgt 38  
40

tctttcctgc gttatcccct gattctgtgg ataaccgtat taccgccttt gagtgagctg 39  
00

ataccgctcg ccgcagccga acgaccgagc gcagcgagtc agtgagcgag gaagcggaag 39  
60

agcgagtttg tagaaacgca aaaaggccat ccgtcaggat ggccttctgc ttaatttgat 40  
20

gcctggcagt ttatggcggg cgtcctgccc gccaccctcc gggccgttgc ttcgcaacgt 40  
80

tcaaataccgc tcccggcgga tttgtcctac tcaggagagc gttcaccgac aaacaacaga 41  
40

taaaacgaaa ggcccagtct ttcgactgag cctttcgttt tatttgatgc ctggcagttc 42  
00

cctactctcg catggggaga cccacacta ccatcggcgc tacggcgctt cacttctgag 42  
60

ttcggcatgg ggtcaggtgg gaccaccgcg ctactgccgc caggcaaatt ctgttttatc 43  
20

agaccgcttc tgcgttctga tttaatctgt atcaggctga aaatcttctc tcatccgcca 43  
80

aaacagccaa gcttataagg cgcgcctcac tgcccgttt ccagtcggga aacctgtcgt 44  
40

gccagctgca ttaatgaatc ggccaacgcg cggggagagg cggtttgctg attgggcgcc 45  
00

agggtgggtt ttcttttcac cagtgagacg ggcaacagct gattgccctt caccgcctgg 45  
60

ccctgagaga gttgcagcaa gcggtccacg ctggtttgcc ccagcaggcg aaaatcctgt 46  
20

ttgatgggtg ttaacggcgg gatataacat gagctgtctt cggtatcgtc gtatcccact 46  
80

Cel-002

accgagatat ccgcaccaac gcgcagcccg gactcggttaa tggcgcgcat tgcgcccagc 47  
40

gccatctgat cgttggcaac cagcatcgca gtgggaacga tgccctcatt cagcatttgc 48  
00

atggtttggt gaaaaccgga catggcactc cagtcgcctt cccgttccgc tatcggtga 48  
60

atttgattgc gagtgaata tttatgccag ccagccagac gcagacgcgc cgagacagaa 49  
20

cttaatgggc ccgctaacag cgcgatttgc tggtgacca atgcgaccag atgctccacg 49  
80

cccagtcgcg taccgtcttc atgggagaaa ataatactgt tgatgggtgt ctggtcagag 50  
40

acatcaagaa ataacgccgg aacattagt caggcagctt ccacagcaat ggcattcctgg 51  
00

tcattccagcg gatagttaat gatcagccca ctgacgcgtt gcgcgagaag attgtgcacc 51  
60

gccgctttac aggtcttcgac gccgcttcgt tctaccatcg acaccaccac gctggcacc 52  
20

agttgatcgg cgcgagattt aatcgccgcg acaatttgcg acggcgcggtg cagggccaga 52  
80

ctggaggtgg caacgccaat cagcaacgac tgtttgcccg ccagttgttg tgccacgcgg 53  
40

ttgggaatgt aattcagctc cgccatcgcc gcttccactt tttcccgcgt tttcgcagaa 54  
00

acgtggctgg cctggttcac cacgcgggaa acggtctgat aagagacacc ggcatactct 54  
60

gcgacatcgt ataacgttac tggtttcacg acgtccatcg aaccgtcctt tgcatacacc 55  
20

ataggtgtgg ttttaattga tgcccttttt cagggctgga atgtgtaaga gcgggggttat 55  
80

ttatgctggt gtttttttgt tactcgggaa gggctttacc tcttccgcgt aaacgcttcc 56  
40

atcagcggtt atagttaaaa aaatctttcg gaactgggtt tgcgcttacc ccaaccaaca 57  
00

Cel-002

ggggatttgc tgctttccat tgagcctggt tctctgcgcg acgttcgcgcg cggcgtgttt 57  
60

gtgcatccat ctggattctc ctgtcagtta gctttggtgg tgtgtggcag ttgtagtctt 58  
20

gaacgaaaac cccccgcgat tggcacattg gcagctaata cggaatcgca cttacggcca 58  
80

atgcttcggt tcgtatcaca caccctaaag ccttctgctt tgaatgctgc ccttcttcag 59  
40

ggcttaattt ttaagagcgt caccttcatt gtggtcagtg cgtcctgctg atgtgctcat 60  
00

tataaccgcc agtggtattt atgtcaacac cgccagagat aatttatcac cgcagatggt 60  
60

tatctgtgca tgcatttacg ttgaca 60  
86

<210> 14

<211> 6086

<212> DNA

<213> Artificial

<220>

<223> Plasmid pTAK132

<400> 14

ccatcgaatg gctgaaatga gctgttgaca attaatacgc cggctcgtat aatgtgtgga 60  
60

attgtgagcg gataacaatt tcacacagga aaccgggttat gagcacaaaa aagaaaccat 1  
20

taacacaaga gcagcttgag gacgcacgtc gccttaaagc aatttatgaa aaaaagaaaa 1  
80

atgaacttgg cttatcccag gaatctgtcg cagacaagat ggggatgggg cagtcaggcg 2  
40

ttggtgcttt atttaattggc atcaatgcat taaatgctta taacgccgca ttgcttgcaa 3  
00

aaattctcaa agttagcgtt gaagaattta gcccttcaat cgccagagaa atctacgaga 3  
60

tgtatgaagc ggtagtatg cagccgtcac ttagaagtga gtatgagtag cctgtttttt 4  
20



Cel-002

ctcatgttca ggcagggatg ttctcacctg agcttagaac ctttaccaaa agtgatgcgg 80	4
agagatgggt aagcacaacc aaaaaagcca gtgattctgc attctggctt gaggttgaag 40	5
gtaattccat gaccgcacca acaggctcca agccaagctt tcctgacgga atgttaattc 00	6
tcgttgaccc tgaacaggct gttgagccag gtgatttctg catagccaga cttgggggtg 60	6
atgagtttac cttcaagaaa ctgatcaggg atagcgggtca ggtgttttta caaccactaa 20	7
accacacagta cccaatgatc ccatgcaatg agagttgttc cgttgtgggg aaagttatcg 80	7
ctagtcaagt gacctgaagag acgtttggct gactgcagca taaataaccc cgctcttaca 40	8
cattccagcc ctgaaaaagg gcatcaaatt aaaccacacc tatgggtgat gcaaaggaat 00	9
ttaaatgggt accatgagta aaggagaaga acttttctact ggagttgtcc caattcttgt 60	9
tgaattagat ggcgatgtta atgggcaaaa attctctgtc agtggagagg gtgaaggtga 20	10
tgcaacatac ggaaaactta cccttaaatt tatttgcact actgggaagc tacctgttcc 80	10
atggccaaca cttgtcacta ctttcgggtta tgggtgttcaa tgctttgcga gataccaga 40	11
tcatatgaaa cagcatgact ttttcaagag tgccatgccc gaaggttatg tacaggaaag 00	12
aactatattt tacaagatg acgggaacta caagacacgt gctgaagtca agtttgaagg 60	12
tgataccctt gttaatagaa tcgagttaaa aggtattgat tttaaagaag atggaaacat 20	13
tcttggacac aaaatggaat acaactataa ctacataat gtatacatca tggcagacaa 80	13
accaaagaat ggaatcaaag ttaacttcaa aattagacac aacattaaag atggaagcgt 40	14
tcaattagca gaccattatc aacaaaatac tccaattggc gatggccctg tccttttacc 00	15

00

agacaaccat tacctgtcca cacaatctgc cctttccaaa gatcccaacg aaaagagaga 15  
60

tcacatgatc cttcttgagt ttgtaacagc tgctgggatt acacatggca tggatgaact 16  
20

atacaaataa aagctagctt ggctgttttg gcggatgaga gaagattttc agcctgatac 16  
80

agattaaatc agaacgcaga agcggctctga taaaacagaa tttgcctggc ggcagtagcg 17  
40

cggtgggtccc acctgacccc atgccgaact cagaagtgaac acgccgtagc gccgatggta 18  
00

gtgtgggggtc tccccatgcg agagtaggga actgccaggc atcaaataaa acgaaaggct 18  
60

cagtcgaaag actgggcctt tcgttttatac tgttgtttgt cggtgaacgc tctcctgagt 19  
20

aggacaaatc cgccgggagc ggatttgaac gttgcgaagc aacggccccg aggggtggcgg 19  
80

gcaggacgcc cgccataaac tgccaggcat caaattaagc agaaggccat cctgacggat 20  
40

ggccttttttg cgtttctaca aactcttttt gtttattttt ctaaatacat tcaaatatgt 21  
00

atccgctcat gagacaataa ccctgataaa tgcttcaata atattgaaaa aggaagagta 21  
60

tgagtattca acatttcctg gtcgccctta ttcccttttt tgccggcattt tgcttccctg 22  
20

tttttgctca ccagaaaacg ctggtgaaag taaaagatgc tgaagatcag ttgggtgcac 22  
80

gagtgggtta catcgaactg gatctcaaca gcggtgaagat ccttgagagt tttcgccccg 23  
40

aagaacgttt tccaatgatg agcactttta aagttctgct atgtggcgcg gtattatccc 24  
00

gtgttgacgc cgggcaagag caactcggtc gccgcataca ctattctcag aatgacttgg 24  
60

ttgagtactc accagtcaca gaaaagcatc ttacggatgg catgacagta agagaattat 25  
20

Cel-002

gcagtgctgc cataaccatg agtgataaca ctgcggccaa cttacttctg acaacgatcg 25  
80

gaggaccgaa ggagctaacc gcttttttgc acaacatggg ggatcatgta actcgccttg 26  
40

atcggttgga accggagctg aatgaagcca taccaaacga cgagcgtgac accacgatgc 27  
00

ctacagcaat ggcaacaacg ttgcgcaaac tattaactgg cgaactactt actctagctt 27  
60

cccggcaaca attaatagac tggatggagg cggataaagt tgcaggacca cttctgcgct 28  
20

cggcccttcc ggctggctgg tttattgctg ataaatctgg agccggtgag cgtgggtctc 28  
80

gcggtatcat tgcagcactg gggccagatg gtaagccctc ccgtatcgta gttatctaca 29  
40

cgacggggag tcaggcaact atggatgaac gaaatagaca gatcgtgag ataggtgcct 30  
00

cactgattaa gcattggtaa ctgtcagacc aagtttactc atatatactt tagattgatt 30  
60

taaaacttca tttttaattt aaaaggatct aggtgaagat cctttttgat aatctcatga 31  
20

ccaaaatccc ttaacgtgag ttttcgttcc actgagcgtc agaccccgta gaaaagatca 31  
80

aaggatcttc ttgagatcct ttttttctgc gcgtaatctg ctgcttgcaa acaaaaaaac 32  
40

caccgctacc agcggtggtt tgtttgccgg atcaagagct accaactctt tttccgaagg 33  
00

taactggctt cagcagagcg cagataccaa atactgtcct tctagtgtag ccgtagttag 33  
60

gccaccactt caagaactct gtagcaccgc ctacatacct cgctctgcta atcctgttac 34  
20

cagtggctgc tgccagtggc gataagtcgt gtcttaccgg gttggactca agacgatagt 34  
80

taccggataa ggcgagcgg tcgggctgaa cgggggggttc gtgcacacag cccagcttgg 35  
40

Cel-002

agcgaacgac ctacaccgaa ctgagatacc tacagcgtga gctatgagaa agcgccacgc 36  
00

ttcccgaagg gagaaaggcg gacaggtatc cggtaagcgg cagggtcgga acaggagagc 36  
60

gcacgagggga gcttccaggg ggaaacgcct ggtatcttta tagtcctgtc gggtttcgcc 37  
20

acctctgact tgagcgtcga tttttgtgat gctcgtcagg ggggcggagc ctatggaaaa 37  
80

acgccagcaa cgcggccttt ttacggttcc tggccttttg ctggcctttt gctcacatgt 38  
40

tctttcctgc gttatcccct gattctgtgg ataaccgtat taccgccttt gaggagctg 39  
00

ataccgctcg ccgcagccga acgaccgagc gcagcgagtc agtgagcgag gaagcggaag 39  
60

agcgagtttg tagaaacgca aaaaggccat ccgtcaggat ggccttctgc ttaatttgat 40  
20

gcctggcagt ttatggcggg cgtcctgccc gccaccctcc gggccgttgc ttcgcaacgt 40  
80

tcaaataccgc tcccggcgga tttgtcctac tcaggagagc gttcaccgac aaacaacaga 41  
40

taaaacgaaa ggcccagtct ttcgactgag cctttcgttt tatttgatgc ctggcagttc 42  
00

cctactctcg catggggaga cccacacta ccatcggcgc tacggcgttt cacttctgag 42  
60

ttcggcatgg ggtcaggtgg gaccaccgcg ctactgccgc caggcaaatt ctgttttatc 43  
20

agaccgcttc tgcgttctga tttaatctgt atcaggctga aaatcttctc tcatccgcca 43  
80

aaacagccaa gcttataagg cgcgcctcac tgcccgtttt ccagtcggga aacctgtcgt 44  
40

gccagctgca ttaatgaatc ggccaacgcg cggggagagg cggtttgctg attgggcgcc 45  
00

agggtggttt ttcttttcac cagtgagacg ggcaacagct gattgccctt caccgcctgg 45  
60

ccctgagaga gttgcagcaa gcggtccacg ctggtttgcc ccagcaggcg aaaatcctgt 46

ttgatggtgg 80	ttaacggcgg	gatataacat	gagctgtctt	cggtatcgtc	gtatcccact	46
accgagatat 40	ccgcaccaac	gcgcagcccg	gactcggtaa	tggcgcgcat	tgcgcccagc	47
gccatctgat 00	cgttggcaac	cagcatcgca	gtgggaacga	tgccctcatt	cagcatttgc	48
atggtttgtt 60	gaaaaccgga	catggcactc	cagtcgcctt	cccgttccgc	tatcggetga	48
atttgattgc 20	gagtgagata	tttatgccag	ccagccagac	gcagacgcgc	cgagacagaa	49
cttaatgggc 80	ccgctaacag	cgcgatttgc	tggtgaccca	atgcgaccag	atgctccacg	49
cccagtcgcg 40	taccgtcttc	atgggagaaa	ataatactgt	tgatgggtgt	ctggtcagag	50
acatcaagaa 00	ataacgccgg	aacattagt	caggcagctt	ccacagcaat	ggcatcctgg	51
tcatccagcg 60	gatagttaat	gatcagccca	ctgacgcgtt	gcgcgagaag	attgtgcacc	51
gccgctttac 20	aggcttcgac	gccgcttcgt	tctaccatcg	acaccaccac	gctggcacc	52
agttgatcgg 80	cgcgagattt	aatcgccgcg	acaatttgcg	acggcgcggtg	cagggccaga	52
ctggagggtg 40	caacgccaat	cagcaacgac	tgtttgccc	ccagttgttg	tgccacgcgg	53
ttgggaatgt 00	aattcagctc	cgccatcgcc	gcttccactt	tttcccgcgt	tttcgcagaa	54
acgtgggtgg 60	cctgggttcac	cacgcgggaa	acggtctgat	aagagacacc	ggcatactct	54
gcgacatcgt 20	ataacgttac	tggtttcatg	acgtccatcc	ggccgtcctt	tgcatacacc	55
ataggtgtgg 80	tttaatttga	tgcccttttt	cagggctgga	atgtgtaaga	gcgggggttat	55
ttatgctgtt 40	gtttttttgt	tactcgggaa	gggctttacc	tcttccgcat	aaacgcttcc	56

Cel-002

atcagcggtt atagttaaaa aaatctttcg gaactgggtt tgcgcttacc ccaaccaaca 57  
00

ggggatttgc tgctttccat tgagcctgtt tctctgcgcg acgttcgcgg cggcgtgttt 57  
60

gtgcatccat ctggattctc ctgtcagtta gctttggtgg tgtgtggcag ttgtagtcc 58  
20

gaacgaaaac cccccgcgat tggcacattg gcagctaata cggaatcgca cttacggcca 58  
80

atgcttcgtt tcgtatcaca caccctaaag ccttctgctt tgaatgctgc ccttcttcag 59  
40

ggcttaattt ttaagagcgt caccttcatg gtggtcagtg cgtcctgctg atgtgctcat 60  
00

tataaccgcc agtgggtattt atgtcaacac cgccagagat aatttatcac cgcagatggt 60  
60

tatctgtgca tgcatttacg ttgaca 60  
86

<210> 15

<211> 6088

<212> DNA

<213> Artificial

<220>

<223> Plasmid pTAK130

<400> 15

ccatcgaatg gctgaaatga gctgttgaca attaatacgc cggctcgtat aatgtgtgga 60  
60

attgtgagcg gataacaatt tcacacagga aaccgggtat gagcacaaaa aagaaccat 1  
20

taacacaaga gcagcttgag gacgcacgtc gccttaaagc aatttatgaa aaaaagaaaa 1  
80

atgaacttgg cttatcccag gaatctgtcg cagacaagat ggggatgggg cagtcaggcg 2  
40

ttggtgcttt atttaatggc atcaatgcat taaatgctta taacgccgca ttgcttgcaa 3  
00

aaattctcaa agttagcgtt gaagaattta gcccttcaat cgccagagaa atctacgaga 3  
60



Cel-002

accaaagaat ggaatcaaag ttaacttcaa aattagacac aacattaaag atggaagcgt 40	14
tcaattagca gaccattatc aacaaaatac tccaattggc gatggccctg tccttttacc 00	15
agacaaccat tacctgtcca cacaatctgc cctttccaaa gatcccaacg aaaagagaga 60	15
tcacatgatc cttcttgagt ttgtaacagc tgctgggatt acacatggca tggatgaact 20	16
atacaaataa aagctagctt ggctgttttg gcggatgaga gaagattttc agcctgatac 80	16
agattaaatc agaacgcaga agcggctctga taaaacagaa tttgcctggc ggcagtagcg 40	17
cggtggtccc acctgacccc atgccgaact cagaagtga aacgccgtagc gccgatggta 00	18
gtgtggggtc tccccatgcg agagtaggga actgccaggc atcaaataaa acgaaaggct 60	18
cagtcgaaag actgggcctt tcgttttatac tgttgtttgt cggtgaacgc tctcctgagt 20	19
aggacaaatc cgccgggagc ggatttgaac gttgcgaagc aacggccccg aggggtggcgg 80	19
gcaggacgcc cgccataaac tgccaggcat caaattaagc agaaggccat cctgacggat 40	20
ggcctttttg cgtttctaca aactcttttt gtttattttt ctaaatacat tcaaatatgt 00	21
atccgctcat gagacaataa ccctgataaa tgcttcaata atattgaaaa aggaagagta 60	21
tgagtattca acatttccgt gtcgccctta ttcccttttt tgcggcattt tgccttcctg 20	22
tttttgctca cccagaaacg ctggtgaaag taaaagatgc tgaagatcag ttgggtgcac 80	22
gagtgggtta catcgaactg gatctcaaca gcggtaagat ccttgagagt tttcgccccg 40	23
aagaacgttt tccaatgatg agcactttta aagttctgct atgtggcgcg gtattatccc 00	24
gtgttgacgc cgggcaagag caactcggtc gccgcataca ctattctcag aatgacttgg 00	24



60

ttgagtactc accagtcaca gaaaagcatc ttacggatgg catgacagta agagaattat 25  
 20  
 gcagtgtctgc cataaccatg agtgataaca ctgcggccaa cttacttctg acaacgatcg 25  
 80  
 gaggaccgaa ggagctaacc gcttttttgc acaacatggg ggatcatgta actcgccttg 26  
 40  
 atcggttggga accggagctg aatgaagcca taccaaacga cgagcgtgac accacgatgc 27  
 00  
 ctacagcaat ggcaacaacg ttgcgcaaac tattaactgg cgaactactt actctagctt 27  
 60  
 cccggcaaca attaatagac tggatggagg cggataaagt tgcaggacca cttctgcgct 28  
 20  
 cgcccttcc ggctggctgg tttattgctg ataaatctgg agccggtgag cgtgggtctc 28  
 80  
 gcggtatcat tgcagcactg gggccagatg gtaagccctc ccgtatcgta gttatctaca 29  
 40  
 cgacgggggag tcaggcaact atggatgaac gaaatagaca gatcgctgag ataggtgcct 30  
 00  
 cactgattaa gcattggtaa ctgtcagacc aagtttactc atatatactt tagattgatt 30  
 60  
 taaaacttca tttttaattt aaaaggatct aggtgaagat cttttttgat aatctcatga 31  
 20  
 ccaaaatccc ttaacgtgag ttttcgttcc actgagcgtc agaccccgta gaaaagatca 31  
 80  
 aaggatcttc ttgagatcct ttttttctgc gcgtaatctg ctgcttgcaa acaaaaaaac 32  
 40  
 caccgctacc agcgggtggtt tgtttgccgg atcaagagct accaactctt tttccgaagg 33  
 00  
 taactggctt cagcagagcg cagataccaa atactgtcct tctagtgtag ccgtagttag 33  
 60  
 gccaccactt caagaactct gtagcaccgc ctacatacct cgctctgcta atcctgttac 34  
 20  
 cagtggctgc tgccagtggc gataagtcgt gtcttaccgg gttggactca agacgatagt 34  
 80



## Cel-002

aggggtgggttt ttctttttcac cagtgagacg ggcaacagct gattgccctt caccgcctgg 45  
 60  
 ccctgagaga gttgcagcaa gcggtccacg ctggtttgcc ccagcaggcg aaaatcctgt 46  
 20  
 ttgatgggtgg ttaacggcgg gatataacat gagctgtctt cggtatcgtc gtatcccact 46  
 80  
 accgagatat ccgcaccaac gcgcagcccg gactcggtaa tggcgcgcat tgcgcccagc 47  
 40  
 gccatctgat cgttggcaac cagcatcgca gtgggaacga tgccctcatt cagcatttgc 48  
 00  
 atggtttggtt gaaaaccgga catggcactc cagtcgcctt cccgttccgc tatcggctga 48  
 60  
 atttgattgc gagtgagata tttatgccag ccagccagac gcagacgcgc cgagacagaa 49  
 20  
 cttaatgggc ccgctaacag cgcgatttgc tggtgacca atgcgaccag atgctccacg 49  
 80  
 cccagtcgcg taccgtcttc atgggagaaa ataatactgt tgatgggtgt ctggtcagag 50  
 40  
 acatcaagaa ataacgccgg aacattagtg caggcagctt ccacagcaat ggcatacctgg 51  
 00  
 tcatccagcg gatagttaat gatcagccca ctgacgcgtt gcgcgagaag attgtgcacc 51  
 60  
 gccgctttac aggcttcgac gccgcttcgt tctaccatcg acaccaccac gctggcacc 52  
 20  
 agttgatcgg cgcgagattt aatcgccgcg acaatttgcg acggcgcgtg cagggccaga 52  
 80  
 ctggagggtgg caacgccaat cagcaacgac tgtttgcccg ccagttgttg tgccacgcgg 53  
 40  
 ttgggaatgt aattcagctc cgccatcgcc gcttccactt tttcccgcgt tttcgcagaa 54  
 00  
 acgtggctgg cctggttcac caccggggaa acggtctgat aagagacacc ggcatactct 54  
 60  
 gcgacatcgt ataacgttac tggtttcatg acgtccatcg aggcttttcc tttgcataca 55  
 20  
 ccataggtgt ggtttaattt gatgcccttt ttcagggtg gaatgtgtaa gagcgggggtt 55  
 80

atztatgctg ttgttttttt gttactcggg aagggttta cctcttcgc ataaacgctt	56
40	
ccatcagcgt ttatagttaa aaaaatcttt cggaactggt tttgcgctta cccaaccaa	57
00	
caggggattt gctgctttcc attgagcctg tttctctgcg cgacgttcgc ggcggcgtgt	57
60	
ttgtgcatcc atctggattc tcctgtcagt tagctttggt ggtgtgtggc agttgtagtc	58
20	
ctgaacgaaa acccccgcg attggcacat tggcagctaa tccggaatcg cacttaacggc	58
80	
caatgcttcg tttcgtatca cacaccccaa agccttctgc tttgaatgct gcccttcttc	59
40	
agggcttaat ttttaagagc gtcaccttca tgggtggtcag tgcgtcctgc tgatgtgctc	60
00	
attataaccg ccagtgggtat ttatgtcaac accgccagag ataatttatc accgcagatg	60
60	
gttatctgtg catgcattta cgttgaca	60
88	

```
<210> 16
<211> 5522
<212> DNA
<213> Artificial
```

<220>  
<223> Plasmid pIKE105

```
<400> 16
ccatcgaatg gctgaaatga gctgttgaca attaatcatc cggctcgtat aatgtgtgga
60
```

attgtgagcg gataacaatt tcacacagga aaccggttat ggaattcatg tctagattag 1  
20

ataaaagtaa agtgattaac agcgcattag agctgcttaa tgaggtcgga atcgaaggtt 1  
80

taacaacccg taaactcgcc cagaagctag gtgtagagca gcctacattg tattggcatg 2  
40

taaaaaataa gcgggctttg ctcgacgcct tagccattga gatgttagat aggcaccata 3

Page 29



## Cel-002

aactcggtcg ccgcatacac tattctcaga atgacttggt tgagtactca ccagtcacag 24  
00  
aaaagcatct tacggatggc atgacagtaa gagaattatg cagtgtgcc ataaccatga 24  
60  
gtgataacac tgcggccaac ttacttctga caacgatcgg aggaccgaag gagctaaccg 25  
20  
cttttttgca caacatgggg gatcatgtaa ctgccttga tcgttgggaa ccggagctga 25  
80  
atgaagccat accaaacgac gagcgtgaca ccacgatgcc tacagcaatg gcaacaacgt 26  
40  
tgcgcaaact attaactggc gaactactta ctctagcttc ccggcaacaa ttaatagact 27  
00  
ggatggaggc ggataaagtt gcaggaccac ttctgcgctc ggcccttcg gctggctggt 27  
60  
ttattgctga taaatctgga gccggtgagc gtgggtctcg cggtatcatt gcagcactgg 28  
20  
ggccagatgg taagccctcc cgtatcgtag ttatctacac gacggggagt caggcaacta 28  
80  
tggatgaacg aaatagacag atcgtgaga taggtgcctc actgattaag cattggtaac 29  
40  
tgtcagacca agtttactca tatatacttt agattgattt aaaacttcat ttttaattta 30  
00  
aaaggatcta ggtgaagatc ctttttgata atctcatgac caaaatccct taacgtgagt 30  
60  
tttcgttcca ctgagcgtca gaccccgtag aaaagatcaa aggatcttct tgagatcctt 31  
20  
tttttctgcg cgtaatctgc tgcttgcaaa caaaaaaacc accgctacca gcggtggttt 31  
80  
gtttgccgga tcaagagcta ccaactcttt ttccgaaggt aactggcttc agcagagcgc 32  
40  
agataccaaa tactgtcctt ctagtgtagc cgtagttagg ccaccacttc aagaactctg 33  
00  
tagcaccgcc tacatactc gctctgctaa tcttgttacc agtggctgct gccagtggcg 33  
60  
ataagtcgtg tcttaccggg ttggactcaa gacgatagtt accggataag gcgcagcggg 34

20

cgggctgaac ggggggttcg tgcacacagc ccagcttgga gcgaacgacc tacaccgaac 34  
 80  
 tgagatacct acagcgtgag ctatgagaaa gcgccacgct tcccgaaggg agaaaggcgg 35  
 40  
 acaggtatcc ggtaagcggc agggctcgaa caggagagcg cacgagggag cttccagggg 36  
 00  
 gaaacgcctg gtatctttat agtcctgtcg ggtttcgcca cctctgactt gagcgtcgat 36  
 60  
 ttttgtgatg ctcgtcaggg gggcggagcc tatggaaaaa cgccagcaac gcggcctttt 37  
 20  
 tacggttcct ggccttttgc tggccttttg ctcacatggt ctttcctgcg ttatcccctg 37  
 80  
 attctgtgga taaccgtatt accgcctttg agtgagctga taccgctcgc cgcagccgaa 38  
 40  
 cgaccgagcg cagcgagtca gtgagcgagg aagcggaaga gcgagtttgt agaaacgcaa 39  
 00  
 aaaggccatc cgtcaggatg gccttctgct taatttgatg cctggcagtt tatggcgggc 39  
 60  
 gtccctgccg ccaccctccg ggccgttgct tcgcaacggt caaatccgct cccggcggat 40  
 20  
 ttgtcctact caggagagcg ttcaccgaca aacaacagat aaaacgaaag gccagtcctt 40  
 80  
 tcgactgagc ctttcgtttt atttgatgcc tggcagttcc ctactctcgc atggggagac 41  
 40  
 cccacactac catcggcgct acggcgtttc acttctgagt tcggcatggg gtcaggtggg 42  
 00  
 accaccgcgc tactgccgcc aggcaaattc tgttttatca gaccgcttct gcgttctgat 42  
 60  
 ttaatctgta tcaggctgaa aatcttctct catccgcaa aacagccaag cttataaggc 43  
 20  
 gcgcctcact gcccgctttc cagtcgggaa acctgtcgtg ccagctgcat taatgaatcg 43  
 80  
 gccaacgcgc ggggagaggg ggtttgcgta ttgggcgcca gggtggtttt tcttttcacc 44  
 40





Cel-002

ctctatcact gatagggatg tcaatctcta tcactgatag ggagcatgca tttacgttga 55  
20

ca 55  
22

<210> 17  
<211> 5525  
<212> DNA  
<213> Artificial

<220>  
<223> Plasmid pIKE107

<400> 17  
ccatcgaatg gctgaaatga gctgttgaca attaatcatc eggctcgtat aatgtgtgga  
60

attgtgagcg gataacaatt tcacacagga aaccggttat ggaattcatg tctagattag 1  
20  
ataaaagtaa agtgattaac agcgcattag agctgcttaa tgaggtcgga atcgaagggt 1  
80  
taacaacccg taaactcgcc cagaagctag gtgtagagca gcctacattg tattggcatg 2  
40  
taaaaaataa gcgggctttg ctcgacgcct tagccattga gatgtttagat aggaccata 3  
00  
ctcacttttg cccttttagaa ggggaaagct ggcaagattt tttacgtaat aacgctaaaa 3  
60  
gttttagatg tgctttacta agtcatcgcg atggagcaaa agtacattta ggtacacggc 4  
20  
ctacagaaaa acagtatgaa actctcgaaa atcaattagc ctttttatgc caacaagggt 4  
80  
tttcactaga gaatgcatta tatgcactca gcgctgtggg gcattttact ttaggttgcg 5  
40  
tattggaaga tcaagagcat caagtcgcta aagaagaaag ggaaacacct actactgata 6  
00  
gtatgccgcc attattacga caagctatcg aattatttga tcaccaaggt gcagagccag 6  
60  
ccttcttatt cggccttgaa ttgatcatat gcggattaga aaaacaactt aaatgtgaaa 7  
20

Cel-002

gtgggtctta actgcagcat aaataacccc gctcttacac attccagccc tgaaaaaggg 80	7
catcaaatta aaccacacct atggtgtatg caaaggaatt taaatgggta ccatgagtaa 40	8
aggagaagaa cttttcactg gagttgtccc aattcttggt gaattagatg gcgatgttaa 00	9
tgggcaaaaa ttctctgtca gtggagaggg tgaaggtgat gcaacatacg gaaaacttac 60	9
ccttaaattt atttgacta ctgggaagct acctgttcca tggccaacac ttgtcactac 20	10
tttcggttat ggtgttcaat gctttgagag ataccagat catatgaaac agcatgactt 80	10
tttcaagagt gccatgcccg aaggttatgt acaggaaaga actatatttt acaaagatga 40	11
cggaactac aagacacgtg ctgaagtcaa gtttgaaggt gatacccttg ttaatagaat 00	12
cgagttaaaa ggtattgatt ttaaagaaga tggaaacatt cttggacaca aaatggaata 60	12
caactataac tcacataatg tatacatcat ggcagacaaa ccaaagaatg gaatcaaagt 20	13
taacttcaaa attagacaca acattaaaga tggaagcggt caattagcag accattatca 80	13
acaaaatact ccaattggcg atggccctgt ccttttacca gacaaccatt acctgtccac 40	14
acaatctgcc ctttccaaag atcccaacga aaagagagat cacatgatcc ttcttgagtt 00	15
tgtaacagct gctgggatta cacatggcat ggatgaacta tacaataaaa agctagcttg 60	15
gctgttttgg cggatgagag aagattttca gcctgatata gattaaatca gaacgcagaa 20	16
gcggtctgat aaaacagaat ttgcctggcg gcagtagcgc ggtggtecca cctgacccca 80	16
tgccgaactc agaagtgaaa cgccgtagcg ccgatggtag tgtgggggtct ccccatgcga 40	17
gagtagggaa ctgccaggca tcaaataaaa cgaaaggctc agtcgaaaga ctgggccttt 00	18

00

cgttttatct gttgtttgtc ggtgaacgct ctcttgagta ggacaaatcc gccgggagcg 18  
60

gatttgaacg ttgcgaagca acggcccgga ggggtggcggg caggacgccc gccataaact 19  
20

gccaggcatc aaattaagca gaaggccatc ctgacggatg gcctttttgc gtttctacaa 19  
80

actctttttg tttatttttc taaatacatt caaatatgta tccgctcatg agacaataac 20  
40

cctgataaat gcttcaataa tattgaaaaa ggaagagtat gagtattcaa catttccgtg 21  
00

tgcgcccttat tccctttttt gcggcatttt gccttcctgt ttttgctcac ccagaaacgc 21  
60

tggtgaaagt aaaagatgct gaagatcagt tgggtgcacg agtgggttac atcgaactgg 22  
20

atctcaacag cggtaagatc cttgagagtt ttcgccccga agaacgtttt ccaatgatga 22  
80

gcacttttaa agttctgcta tgtggcgcggt tattatcccg tggtgacgcc gggcaagagc 23  
40

aactcggtcg ccgcatacac tattctcaga atgacttggg tgagtactca ccagtcacag 24  
00

aaaagcatct tacggatggc atgacagtaa gagaattatg cagtgctgcc ataaccatga 24  
60

gtgataacac tgcggccaac ttacttctga caacgatcgg aggaccgaag gagctaaccg 25  
20

cttttttgca caacatgggg gatcatgtaa ctgccttga tcgttgggaa ccggagctga 25  
80

atgaagccat accaaacgac gagcgtgaca ccacgatgcc tacagcaatg gcaacaacgt 26  
40

tgcgcaaact attaactggc gaactactta ctctagcttc ccggcaacaa ttaatagact 27  
00

ggatggaggc ggataaagtt gcaggaccac ttctgcgctc ggccttccg gctggctggg 27  
60

ttattgctga taaatctgga gccggtgagc gtgggtctcg cggtatcatt gcagcactgg 28  
20

ggccagatgg taagccctcc cgtatcgtag ttatctacac gacggggagt caggcaacta 28  
 80  
 tggatgaacg aaatagacag atcgtcgaga taggtgcctc actgattaag cattggtaac 29  
 40  
 tgtcagacca agtttactca tatatacttt agattgattt aaaacttcat ttttaattta 30  
 00  
 aaaggatcta ggtgaagatc ctttttgata atctcatgac caaaatccct taacgtgagt 30  
 60  
 tttcgttcca ctgagcgtca gaccccgtag aaaagatcaa aggatcttct tgagatcctt 31  
 20  
 tttttctgcg cgtaatctgc tgcttgcaaa caaaaaaacc accgctacca gcggtggttt 31  
 80  
 gtttgccgga tcaagagcta ccaactcttt ttccgaaggt aactggcttc agcagagcgc 32  
 40  
 agataccaaa tactgtcctt ctagtgtagc cgtagttagg ccaccacttc aagaactctg 33  
 00  
 tagcaccgcc tacatacctc gctctgctaa tctgttacc agtggctgct gccagtggcg 33  
 60  
 ataagtcgtg tcttaccggg ttggactcaa gacgatagtt accggataag ggcagcgggt 34  
 20  
 cgggctgaac ggggggttcg tgcacacagc ccagcttgga gcgaacgacc tacaccgaac 34  
 80  
 tgagatacct acagcgtgag ctatgagaaa gcgccacgct tcccgaaggg agaaaggcgg 35  
 40  
 acaggtatcc ggtaagcggc agggtcggaa caggagagcg cacgaggag cttccagggg 36  
 00  
 gaaacgcctg gtatctttat agtcctgtcg ggtttcgcca cctctgactt gagcgtcgat 36  
 60  
 ttttgtgatg ctcgtcaggg gggcggagcc tatggaaaaa cgccagcaac gcggcctttt 37  
 20  
 tacggttccct ggccttttgc tggccttttg ctcacatggt ctttctgcg ttatccctg 37  
 80  
 attctgtgga taaccgtatt accgcctttg agtgagctga taccgctcgc cgcagccgaa 38  
 40

Cel-002

cgaccgagcg cagcgagtca gtgagcgagg aagcggaaga gcgagtttgt agaaacgcaa 39  
00

aaaggccatc cgtcaggatg gccttctgct taatttgatg cctggcagtt tatggcgggc 39  
60

gtcctgcccg ccaccctccg ggccgttgct tcgcaacgtt caaatccgct cccggcggat 40  
20

ttgtcctact caggagagcg ttcaccgaca aacaacagat aaaacgaaag gcccagtctt 40  
80

tcgactgagc ctttcgtttt atttgatgcc tggcagttcc ctactctcgc atggggagac 41  
40

cccacactac catcggcgct acggcgtttc acttctgagt tcggcatggg gtcaggtggg 42  
00

accaccgcgc tactgccgcc aggcaaattc tgttttatca gaccgcttct gcgttctgat 42  
60

ttaatctgta tcaggctgaa aatcttctct catccgcaa aacagccaag cttataaggc 43  
20

gcgctcact gcccgctttc cagtcgggaa acctgtcgtg ccagctgcat taatgaatcg 43  
80

gccaacgcgc ggggagaggc ggtttgcgta ttgggcgcca gggtggtttt tcttttcacc 44  
40

agtgagacgg gcaacagctg attgcccttc accgcctggc cctgagagag ttgcagcaag 45  
00

cggtccacgc tggtttgccc cagcaggcga aaatcctggt tgatgggtggg taacggcggg 45  
60

atataacatg agctgtcttc ggtatcgctg tatcccacta ccgagatatc cgcaccaacg 46  
20

cgcagcccgg actcggtaat ggcgcgcatt gcgccagcg ccatctgacg gttggcaacc 46  
80

agcatcgcag tgggaacgat gccctcattc agcatttgca tggtttggtg aaaaccggac 47  
40

atggcactcc agtcgccttc ccgttccgct atcggtgaa tttgattgcg agtgagatat 48  
00

ttatgccagc cagccagacg cagacgcgcc gagacagaac ttaatgggcc cgctaacagc 48  
60

gcgatttgct ggtgacccaa tgcgaccaga tgctccacgc ccagtcgcgt accgtcttca 49

20

tgaggagaaaa taatactgtt gatgggtgtc tggtcagaga catcaagaaa taacgccgga 49  
80

acattagtgc aggcagcttc cacagcaatg gcatactggt catccagcgg atagttaatg 50  
40

atcagcccac tgacgcgttg cgcgagaaga ttgtgcaccg ccgctttaca ggcttcgacg 51  
00

ccgcttcggt ctaccatcga caccaccacg ctggcaccca gttgatcggc gcgagattta 51  
60

atcgccgcga caatttgca cggcgcgtgc agggccagac tggaggtggc aacgccaatc 52  
20

agcaacgact gtttgcccgc cagttgttgt gccacgcggt tgggaatgta attcagctcc 52  
80

gccatcgccg cttccacttt ttcccgcgtt ttgcagaaa cgtggctggc ctggttcacc 53  
40

acgcgggaaa cggcttgata agagacaccg gcatactctg cgacatcgta taacgttact 54  
00

ggtttcatga cgtccatggt ctgtttcctc ctggtcagtg cgtcctgctg atgtgctcag 54  
60

tatctctatc actgataggg atgtcaatct ctatcactga tagggagcat gcatttacgt 55  
20

tgaca 55  
25

FOI b7C b7D b7E b7F b7G b7H b7I b7J b7K b7L b7M b7N b7O b7P b7Q b7R b7S b7T b7U b7V b7W b7X b7Y b7Z